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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 1.002.077 WO	FOR FURTHER ACTION	
International application No. PCT/NL2004/000005	International filing date (day/month/year) 06.01.2004	Priority date (day/month/year) 08.01.2003
International Patent Classification (IPC) or national classification and IPC H01L23/28		
Applicant FICO B.V. et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ sent to the applicant and to the International Bureau) a total of 10 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☒ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in Item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand 24.07.2004	Date of completion of this report 02.09.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Kästner, M Telephone No. +31 70 340-2598 

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/NL2004/000005

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-7 received on 28.06.2005 with letter of 27.06.2005

Claims, Numbers

1-11 received on 28.06.2005 with letter of 27.06.2005

Drawings, Sheets

1/2, 2/2 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☒ the description, pages 2
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3, 5-7, 9, 11
	No: Claims	1,2,4,8,10
Inventive step (IS)	Yes: Claims	-
	No: Claims	1-11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	-

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: WO 01/17012 A (VERMEULEN RICHARD THEODORUS ; FICO BV (NL);
PETERS HENDRIKUS JOHANNES) 8 March 2001
- D2: not referred to in this communication
- D3: PATENT ABSTRACTS OF JAPAN vol. 1995, no. 11, 26 December 1995 & JP
07 205214 A (PACK VISION:KK), 8 August 1995

The assessment of novelty and inventive step according to Article 33(1) PCT has revealed that the subject-matter of claims 1, 2, 4, 8 and 10 is not new in the sense of Article 33(2) PCT, and that the subject-matter of claims 3, 5-7, 9 and 11 does not involve an inventive step in the sense of Article 33(3) PCT, the reasons being as follows:

INDEPENDENT CLAIM 1

The document D1 discloses (the references in parentheses applying to this document):

- a device for encapsulating with encapsulating material an electronic component (6, Fig. 4), fixed on a carrier (5 Fig. 4), comprising :
 - two co-acting mould parts (2 and 17, Fig. 4) which are displaceable relative to each other between an encapsulating position, in which the mould parts, when closing onto the carrier, occupy a position for defining at least one mould cavity, and an opened position in which the mould parts are situated at a greater distance from each other than in the encapsulating position, and
 - feed means (16, 8 Fig. 4) for encapsulating material connecting onto at least one projecting edge (edge of the holder member 17, attached to sleeve 16 on the left hand side, Fig. 4, corresponding to ref. 11 in Fig. 2) under which is located a receiving space for a part of the carrier, wherein the projecting edge forms a stationary assembly with one of the mould parts (sleeve 16 rigidly linked with holder member 17, sleeve 16 moves with holder 17, p. 5 l. 24), which mould part also receives a support (3, Fig. 4) for the carrier that is displaceable relative to the edge.

The subject-matter of claim 1 is therefore not new in the sense of Article 33(2) PCT.

CLAIM 2

It is also known from D1 that the projecting edge is a strip (sleeve holder strip, p. 5 l. 25). The subject-matter of claim 2 is therefore not new in the sense of Article 33(2) PCT.

CLAIM 3

The subject matter of claim 3 differs from the device for encapsulating disclosed in D1 in that the material strip forming the projecting edge is assembled releasably with the mould part. The underlying problem is that the projecting edge gets worn and thus cannot function properly any more. However, it is common in machine designing, and therefore obvious to the skilled person, to make wearing parts replaceable. The subject-matter of claim 3 is therefore not inventive (Art. 33 (3) PCT).

CLAIM 4

D1 further discloses the additional feature of claim 4: support 3 (Fig. 4) forms the bottom side of the space receiving the carrier. The subject-matter of claim 4 is therefore not new in the sense of Article 33(2) PCT.

CLAIM 5

The document D1 is regarded as being the closest prior art to the subject-matter of claim 5, and discloses a device for encapsulating with encapsulating material an electronic component as described in claim 1 (see discussion of claim 1 above) from which the subject-matter of claim 5 differs in that the device is provided with release means for displacing the carrier in the direction of the displaceable support.

This has the advantage that after the device on the carrier is encapsulated, the release means eject the carrier with the encapsulated device from the top mould. Simultaneously the gate portion that is formed during the encapsulation is automatically cut off. This simplifies the mechanical setup and also makes the encapsulation process more efficient because no extra ejection step is required.

The problem to be solved by the present invention may therefore be regarded as modifying the moulding device disclosed in D1 in such a way that the mechanical setup is simplified

and the encapsulation process is made more efficient.

The solution proposed in claim 5 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reason: A top mould with spring driven release means has already been disclosed for the same purpose, see Fig. 3 in D3. (The encapsulated device is automatically ejected and the gate portion is cut off when the mould parts are moved apart.) The skilled person would therefore combine the device disclosed in D1 with a top mould as disclosed in D3.

CLAIM 6

D3 further discloses a pressure element (spring 8 and mould cavity 2 in Fig. 3) in the upper mould part. The subject-matter of claim 6 is therefore not inventive (Art. 33 (3) PCT).

CLAIM 7

D3 discloses a moulding device with a pressure element (mould cavity 2 with spring 8, Fig. 3) from which the subject-matter of claim 7 differs in that the pressure element is connected to a control member which, in the situation of mould parts being closed together, urges the pressure element into a position where the pressure element lies clear of the carrier.

Claim 7 refers to an embodiment wherein the shape of the pressure-element (springs 16 and ejector bed 14 in the Figures of the present application) differs from the shape of the pressure element in the prior art (mould cavity 2 with spring 8, Fig. 3 in D3). However, the function is the same, namely automatically ejecting the encapsulated device from the mould and cutting off the gate. The special shape of the pressure-element in the present invention does not solve a particular problem and must therefore be considered as equivalent to the pressure-element in the prior art. The subject-matter of claim 7 is therefore not inventive (Art. 33 (3) PCT)

INDEPENDENT CLAIM 8

D1 further discloses

a method for encapsulating with encapsulating material an electronic component, in

particular a semiconductor, fixed on a carrier, comprising the processing steps of :

- A) placing the carrier on a first mould part such that at least one projecting edge connected to the first mould part lies on the side opposite the side of the carrier supporting on the first mould part (Fig. 4),
- B) reducing the distance between the projecting edge and the part of the first mould part supporting the carrier such that a part. of the carrier is clamped between the part of the first mould part supporting the carrier and the projecting edge (Fig. 2),
- C) closing a second mould part onto the first mould part such that at least one mould cavity (mould cavity 4) is formed closing onto the carrier (Fig. 3), and
- D) feeding liquid encapsulating material to the mould cavity (moulding material 14 in mould cavity 4, Fig. 3), wherein during step B) the support part is moved in the first mould part towards the projecting edge that is kept stationary (sleeve 16 is rigidly linked with - and thus not moving with respect to - holder member 17, see p. 5 l. 25)

The subject-matter of claim 8 is therefore not new in the sense of Article 33(2) PCT.

CLAIM 9

In claim 9 a slight constructional change in the method of claim 8 is defined which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen (see also D4, degating by rotation). Consequently, the subject-matter of claim 9 also lacks an inventive step (Article 33(3) PCT).

CLAIM 10

D1 further discloses the additional features of claim 10 (Fig. 3 and p. 5 l. 16). The subject-matter of claim 10 is therefore not new in the sense of Article 33(2) PCT.

CLAIM 11

The additional feature of claim 11 is obvious from D2, Fig. 3 for the skilled person, should the problem arise that the carrier needs to be clamped with a controllable force. The subject-matter of claim 17 does therefore not involve an inventive step in the sense of Article 33(3) PCT.

Re Item VIII

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(SEPARATE SHEET)**

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The expression "stationary assembly" in claim 1 is not clear, in particular since it appears - at first sight - to be in contradiction with the expression "assembled releasably" in claim 3. "stationary assembly" is interpreted here as being rigidly connected. "Assembled releasably" is interpreted such that means are provided to exchange the strip, e.g. when it is worn (description, p. 2, l. 33 ff).

The phrase "such that the carrier can be urged against the projecting edge with a controllable force" used in claim 1 is not clear because it is not clear what technical features are implied by this requirement.